

Instrumentation Challenges of the strong-field QED experiment LUXE at the European XFEL

Friday 17 September 2021 10:38 (1 minute)

The LUXE experiment aims at studying high-field QED in electron-laser and photon-laser interactions, with the 16.5 GeV electron beam of the European XFEL and a laser beam with power of up to 350 TW. The experiment will measure the spectra of electrons and photons in non-linear Compton scattering where production rates in excess of 109 are expected per 1 Hz bunch crossing. At the same time positrons from pair creation in either the two-step trident process or the Breit-Wheeler process will be measured, where the expected rates range from 10⁻³ to 103 per bunch crossing, depending on the laser power and focus. These measurements have to be performed in the presence of low-energy high radiation-background. To meet these challenges, for high-rate electron and photon fluxes, the experiment will use Cherenkov radiation detectors, scintillator screens, sapphire sensors as well as lead-glass monitors for backscattering off the beam-dump. A four-layer silicon-pixel tracker and a compact electromagnetic tungsten calorimeter with GaAs sensors will be used to measure the positron spectra. The layout of the experiment and the expected performance under the harsh radiation conditions will be presented.

Your name

Jenny List

email

jenny.list@desy.de

Title

Dr.

Nationality

German

Institute

DESY

Author: FLECK, Kyle (Queen's University Belfast)

Presenter: FLECK, Kyle (Queen's University Belfast)

Session Classification: Poster Session 7 (Detectors for High Radiation and Extreme Environments)

Track Classification: Detectors for High Radiation and Extreme Environments